

Appl No. 10/766,532
Amdl. Dated June 7, 2006
Reply to Office Action of March 7, 2006

Attorney Docket No. 81880.0118
Customer No.: 26021

REMARKS/ARGUMENTS

Claim 1 is amended. New claims 6-20 are added. Claims 1-20 are pending in the application. Reexamination and reconsideration of the application, as amended, are respectfully requested.

Claim Rejections -35 U.S.C. § 102

Claim 1 stands rejected as being unpatentable over Weldon et al., U.S. Patent No. 6,108,189. Claim 1 has been amended. Applicant respectfully traverses the rejection as to the amended claims.

The present invention is directed to an electrostatic chuck used in an apparatus for manufacturing semiconductor devices or liquid crystal devices. A wafer, such as a semiconductor wafer or a liquid crystal glass substrate, is mounted on the electrostatic chuck in the apparatus. (Specification, Background Section)

Claim 1 as amended is as follows:

1. (Currently Amended) An electrostatic chuck comprising:
 - a circular ceramic plate having an electrostatic attractive electrode;
 - a mounting surface for supporting a wafer formed on one of the main surfaces of the circular ceramic plate;
 - an annular gas groove formed on the periphery of the mounting surface in the form of concentric circles and a first gas inlet which communicates with the annular gas groove; and
 - a circular gas recess formed inside the circular ceramic plate, and a second gas inlet which communicates with the circular gas recess,

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wherein the annular gas groove and the circular gas recess are independently separated from each other by a first annular rib protrusion, and

wherein a plurality of dotted protrusions are disposed within both the annular gas groove and the circular gas recess.

As shown in FIG. 1B, in one embodiment of the present invention, a circular gas recess 8 is provided with a gas inlet 4 opened in the center of the main surface of the circular ceramic plate 2, with the circular gas recess 8 being placed centered on a first gas inlet 4. Dotted protrusions 11 are disposed within the region of the circular gas recess 8. An annular gas groove 9 is disposed on the periphery of the mounting surface 3 with a second gas inlet 5 communicating with annular gas groove 9. Dotted protrusions 12 are formed within the region of the annular gas groove 9. The gas filled in the annular gas groove 9 and the circular gas recess 8 are sealed from each other by the second annular protrusion 14. (Applicant's Specification, para. 0038).

When wafer W is fixed onto the mounting surface 3 of the electrostatic chuck 1, and inert gas is supplied to the gas inlets 4 and 5, one part of the gas is supplied to a space formed between the circular gas recess 8 radially extending from the gas inlet 4 and the wafer W, and the other gas is supplied to spaces formed between the annular gas groove 9 and the wafer W. Thus, inert gas having mutually different pressure can be supplied to the circular gas recess 8 and the annular gas groove 9 from the gas inlets 4 and 5. (Applicant's Specification, at para. 0039)

This is important at least because the periphery of the wafer W put on the mounting surface 3 tends to provide great heat dissipation, to cause a decrease in temperature, with the result that the in plane temperature difference on the wafer W tends to become greater. However, in the present invention, since the electrostatic chuck has the annular gas groove 9 on the periphery of the mounting

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surface 3, the heat conduction is made greater by increasing a pressure of gas in the peripheral, annular gas groove 9, increasing heat transferred from the upper surface of the electrostatic chuck to the wafer W, and consequently to raise the temperature on the periphery of the wafer. (Applicant's Specification, at para. 0040)

Applicant respectfully submits that the Weldon et al. cannot anticipate present claim 1 because Weldon, et al. fails to either teach or suggest the construction of an electrostatic chuck required by claim 1. Specifically, nothing in Weldon et al. teaches an electrostatic chuck "wherein the annular gas groove and the circular gas recess are independently separated from each other by a first annular rib protrusion" as required by claim 1.

Weldon et al. is directed to an electrostatic chuck useful for holding a substrate in a high density plasma. The office cites Figs. 3a-3b and 4a-4b. However, nothing in Weldon et al. teaches or suggest a construction in which "the annular gas groove and the circular gas recess are independently separated from each other by a first annular rib protrusion" as required by claim 1.

Further, claim 1 requires that "a plurality of dotted protrusions are disposed within both the annular gas groove and the circular gas recess." The Office apparently contends that Weldon et al. discloses a plurality of dotted protrusions being disposed within the annular gas groove. However, nothing in Weldon et al. describes the structures identified by the office as protrusions.

The office appears to have identified the reference numeral 150 in Fig.3b as referring to "a plurality of dotted protrusions (150) as being disposed with the circular gas recess." However, Weldon et al. describes the reference numeral 150 in Fig. 3B as referring to "a plurality of heat transfer gas flow conduits (150)..." (Weldon, at 8:28-32) Moreover, as shown in Fig. 5, the gas flow conduits (150) do not appear to be protrusions.

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The Office similarly contends that "Weldon also discloses in Figure 5C (200B) where a plurality of dotted protrusions being disposed within the annular gas groove." Applicant respectfully disagrees. As explained in Weldon et al. at col. 11, lines 47-53, the completed electrical isolator shown in Fig. 5C does not protrude:

"A layer of dielectric (not shown) is formed over the surface 208 of the annular ring 180 and electrode 110 and processed to the desired thickness to expose the hole 206 of the insert 200b. Thereafter, the apex is removed, for example, by grinding or ablating; or a dielectric member 115 is formed around the apex to hold the dielectric insert 200b in position."

This makes clear that the structure 200B does not protrude into annular gas groove because of either (1) the layer of dielectric (not shown) and grinding to expose the hole 206 or (2) the presence of a dielectric later 115 (See Fig. 5d).

Based on the foregoing, Weldon does not disclose that "a plurality of dotted protrusions are disposed within both the annular gas groove and the circular gas recess" as required by amended claim 1. For this additional reason, withdrawal of the rejection and allowance of amended claim 1 is respectfully requested.

Claim Rejections - 35 U.S.C. § 102

Claims 1-2 and 4-5 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Lue et al. (U.S. Patent No. 5,776,102) in view of Weldon et al. (U.S. Patent No. 6,108,189). Claim 1 is amended. Applicant respectfully traverses the rejection as to the amended claims.

The office admits that Lue et al. does not disclose "a plurality of dotted protrusions are disposed within both the annular gas groove and the circular gas

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recess" as required by amended claim 1. Nonetheless, the Office argues that "Weldon discloses in figure 4a, where a plurality of dotted protrusions being disposed within the annular groove."

Applicant respectfully disagrees. Applicant has been unable to identify any structure in Fig. 4a that Weldon et al. identifies as being a protrusion in the annular groove. To the extent the office refers to "a plurality of dotted protrusions (150)", Applicant has already shown, above, that these are not protrusions. Second, to the extent the Office claims the structure 200B is a protrusion, Applicant has already shown, above, that these are also not protrusions. As such, the combination of references cited by the Office does not teach or suggest each claim limitation and therefore cannot render the claimed invention obvious. Withdrawal of the rejection and allowance of claim 1 is respectfully requested.

Claims 2 and 4-5 depend from claim 1 and are patentable for at least the same reasons as claim 1. Withdrawal of the rejection and allowance of claims 2 and 4-5 is respectfully requested.

Claims 3, which depends from claim 1, stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Lue et al. (U.S. Patent No. 5,776,102) in view of Weldon et al. (U.S. Patent No. 6,108,189) as applied to claim 1 and further in view of Chen et al. (2002/0135968). Claim 1 is amended. Applicant respectfully traverses the rejection as to the amended claims.

Applicant has already shown that the combination of Lue et al. and Weldon et al. do not teach or suggest "a plurality of dotted protrusions are disposed within both the annular gas groove and the circular gas recess" as required by amended claim 1. Chen does not supply the missing teaching and is not cited by the office for doing so. As such, claim 3 is patentable for at least the same reasons as amended claim 1. Withdrawal of the rejection and allowance of claim 3 is respectfully requested.

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In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6700 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

Respectfully submitted,

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Date: June 7, 2006

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